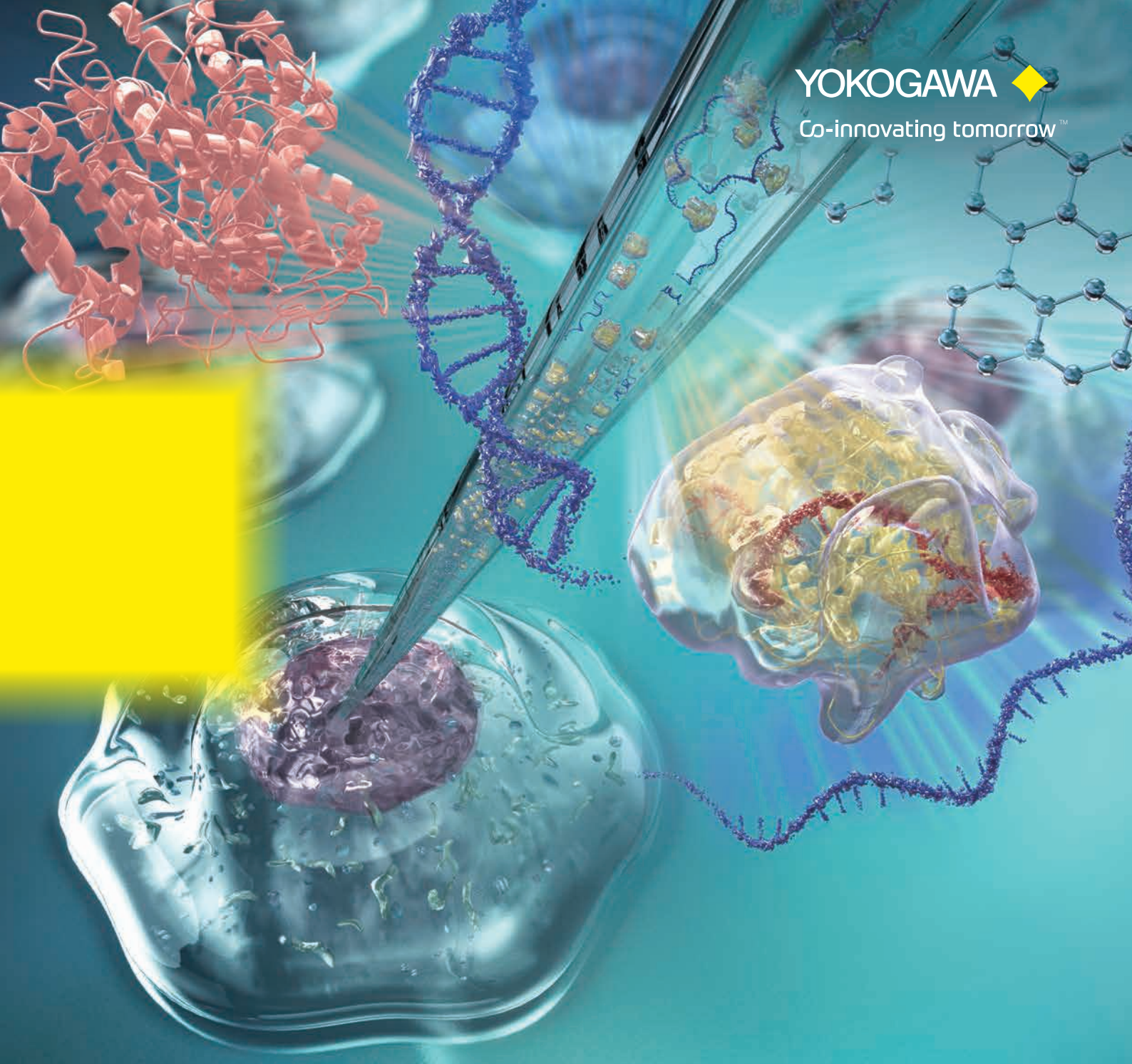




YOKOGAWA 
Co-innovating tomorrow™

Nano-point Delivery Imaging System

Next-Generation Live Cell Analysis

Delivering, Seeing, and Unraveling at the Single-Cell Level

Intracellular Delivery Option

- + **SU10**
 - Substance delivery and sampling at the single cell level
 - Efficient intracellular delivery of proteins and fluorescent probes
 - High temporal-resolution analysis when combined with CSU

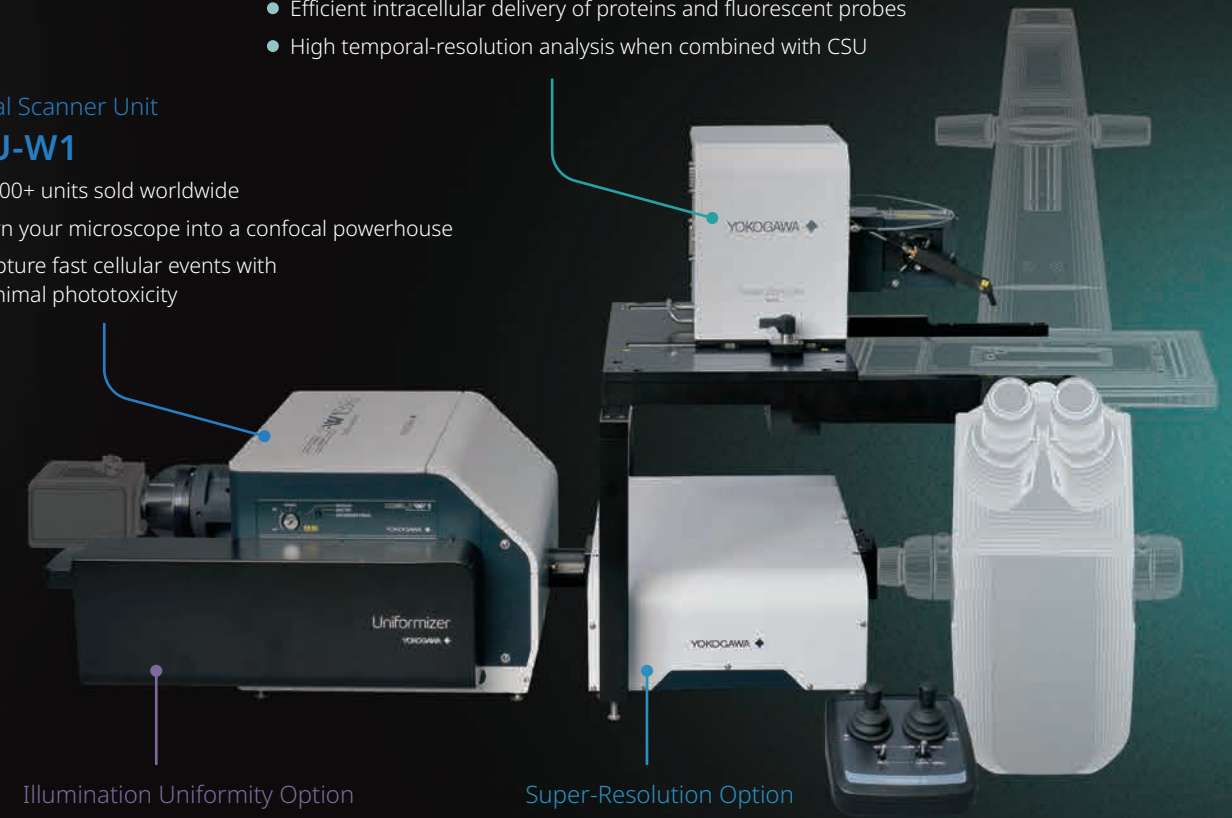
Confocal Scanner Unit

+ CSU-W1

- 4,000+ units sold worldwide
- Turn your microscope into a confocal powerhouse
- Capture fast cellular events with minimal phototoxicity

- **CSU-W1 Uniformizer**
 - Enables uniform excitation across the field of view

Super-Resolution Option
+ **CSU-W1 SoRa**
• Enables super-resolution live imaging



Deliver substances into cells at any given moment and capture even cellular events lasting mere seconds in real time.

Cell	U2OS
Substance	GFP-FUS

User's voice

Using SU10 for intracellular delivery and CSU for high-speed imaging, we successfully observed the intracellular behavior of the phase-separating protein FUS. We hope this approach will contribute to elucidating the mechanisms underlying neurodegenerative diseases.

Figure 1 displays four time-lapse fluorescence microscopy images of a cell at 0s, 30s, 120s, and 400s. The images show the cell's morphology and internal structures, with a scale bar of 10 μ m.

Cell	HeLa
Substance	Alexa Fluor® 647-conjugated anti-TOMM20 antibody

Learn more >>



Cell	HCT-116
Substance	Monobodies & Alexa Fluor® 405-conjugated streptavidin

User's voice

The application of artificial antibody monobodies in cell biological studies has been limited due to the difficulty in intracellular delivery. Using SU10, we achieved high-temporal resolution analysis by delivering monobodies directly into the nucleus. We expect that SU10 will facilitate the application of useful research tools such as monobodies.

Cell	HeLa S3
Substance	Histone-binding compound

Courtesy of Dr. Shigehiro Kawashima, Graduate School of Pharmaceutical Sciences, The University of Tokyo



De facto standard tool for
live-cell imaging

Wide and Clear

CSU-W1

CSU-W1

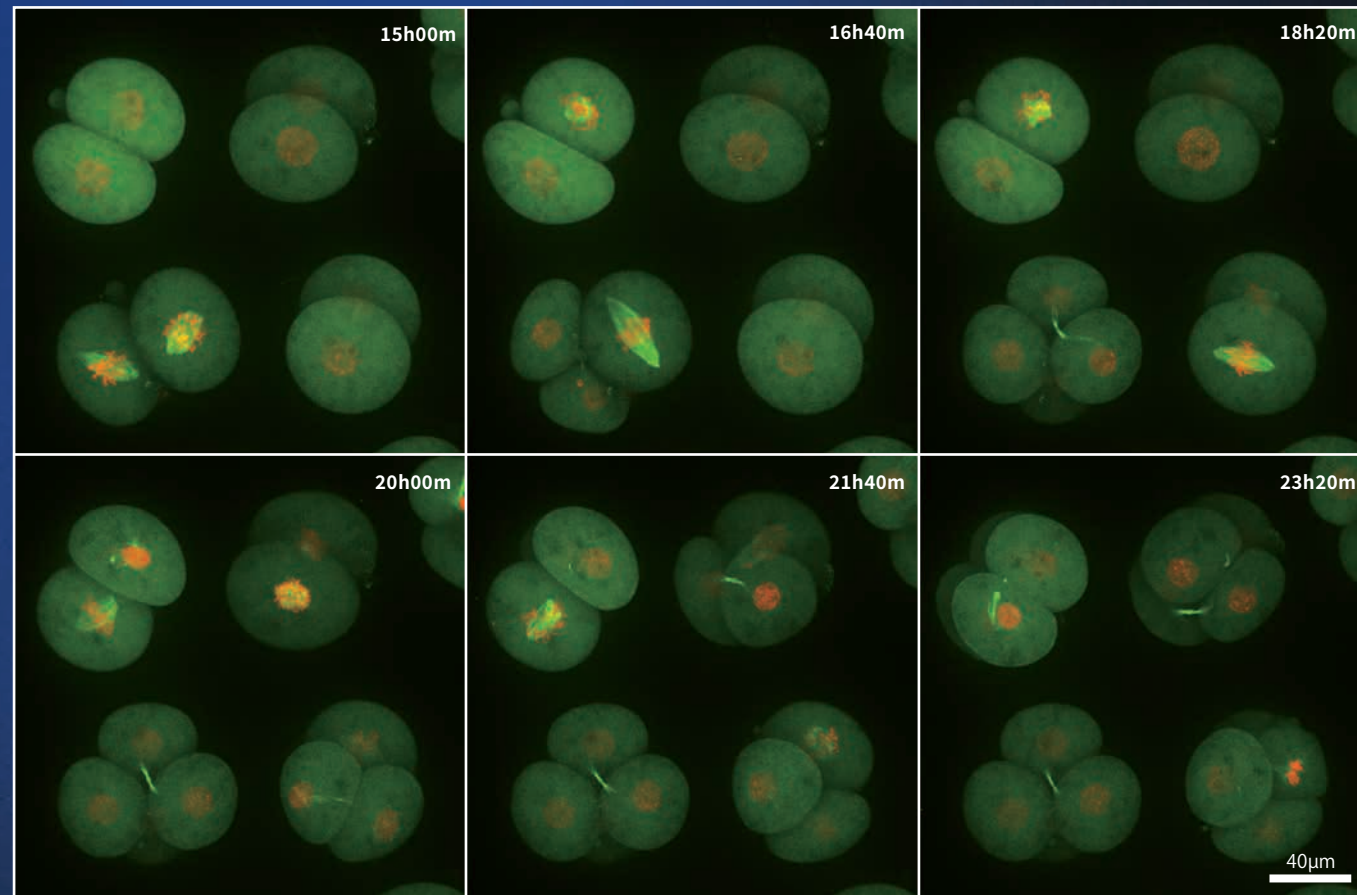
Advantage

- High-speed
- Low photobleaching
- Low phototoxicity

Ideal for
Users Who

- Experience long imaging times
- Have difficulty visualizing their target
- Observe cell damage or death during imaging

Early stage mouse embryo



Excerpts from time-lapse data (MIP)

Fluorescent probe: H2B-EGFP (Excitation: 488 nm), mCherry-MBD-NLS (Excitation: 561 nm)

Pinhole: 50 µm

Objective lens: 60x silicone

Z-sections/stack: 100 µm (1 µm/101 slices)

Total time: 48 h (Interval: 10 min)

Courtesy of: Dr. Kazuo Yamagata, Osaka University (Present post: Kindai University)

Learn more



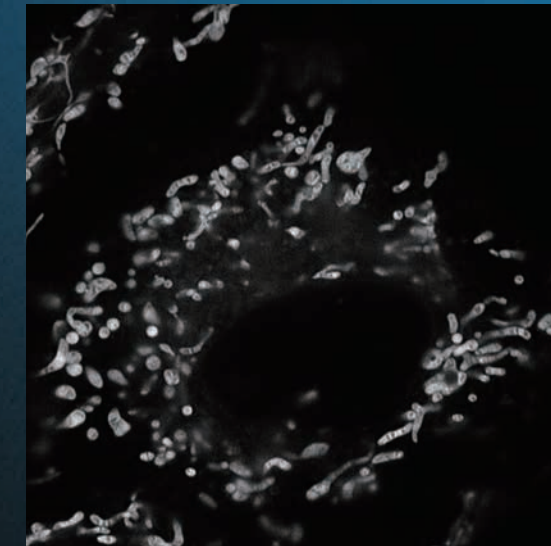
Super-Resolution Option

SoRa

Advantage

- Approximately 120 nm XY resolution beyond the optical diffraction limit without compromising CSU-W1's ease-of-use
- Upgradeable from the CSU-W1

Real time live cell imaging of mitochondria



Courtesy of: Dr. Kaoru Katoh, National Institute of Advanced Industrial Science and Technology

Learn more



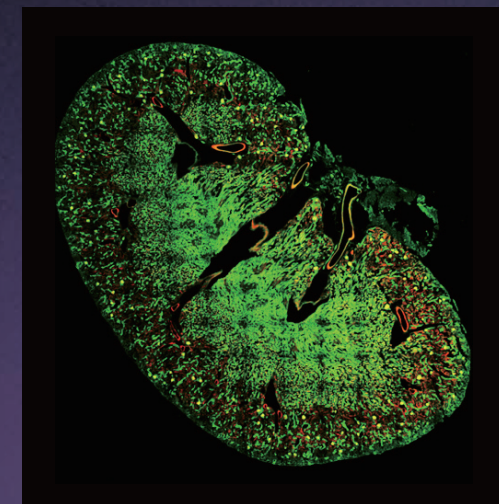
Illumination Uniformity Option

Uniformizer

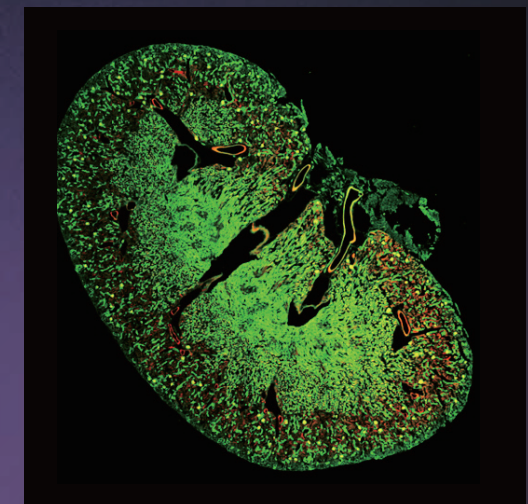
CSU-W1 Uniformizer

Advantage

- Uniform and efficient illumination of the entire wide field of view
- Compatible with CSU-W1 and CSU-W1 SoRa



CSU-W1



with Uniformizer

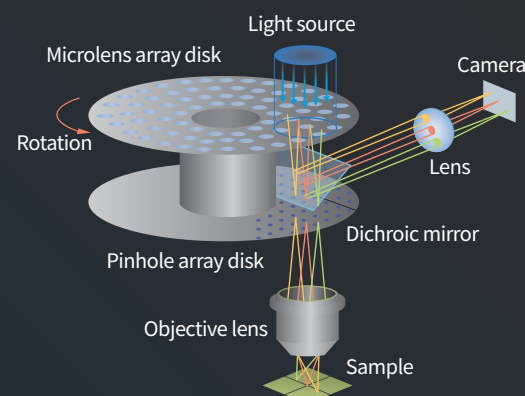
Principle

CSU

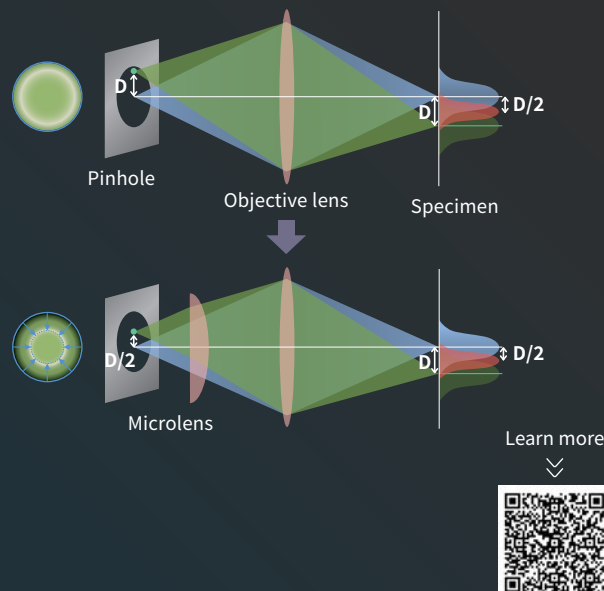
Confocal Scanner Unit CSU-W1

Micro-lens-Enhanced Dual Nipkow Disk Scanning Method

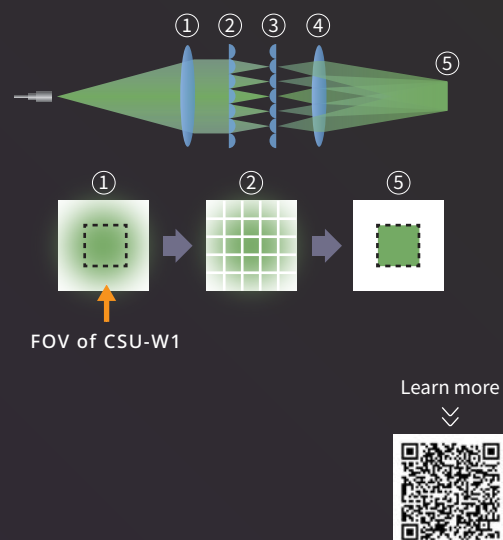
A Nipkow spinning disk containing many pinholes placed in the constant pitch helical pattern and a second disk containing the same number of micro-lens to focus excitation laser into each pinhole are mechanically fixed with a motor, and very rapidly raster scan the field of view with a large number of laser beams. The multi-beam scanning method offers not only high-speed imaging but also significantly reduced photo-toxicity and photo bleaching because of very reduced laser power of each beamlet.



Super-Resolution Option SoRa



Illumination Uniformity Option Uniformizer



Intracellular Delivery Option

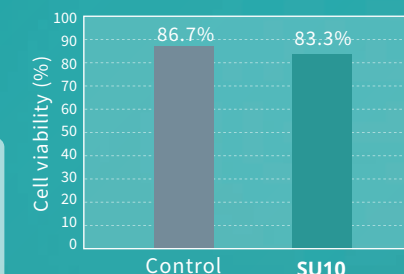
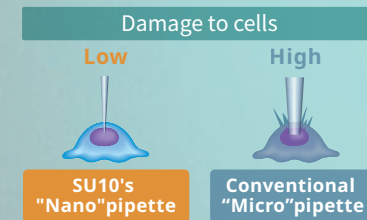
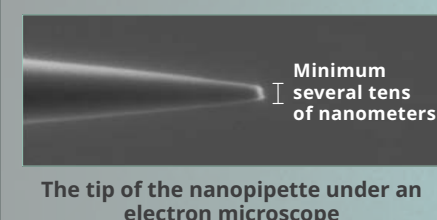
SU10

Advantage

- Single-cell targeted delivery & sampling
- Efficient intracellular protein & probe delivery
- Substance delivery to primary cells and plant cells

Minimum damage to cells

The nanopipette is a glass pipette with a minimum tip outer diameter of several tens of nanometers



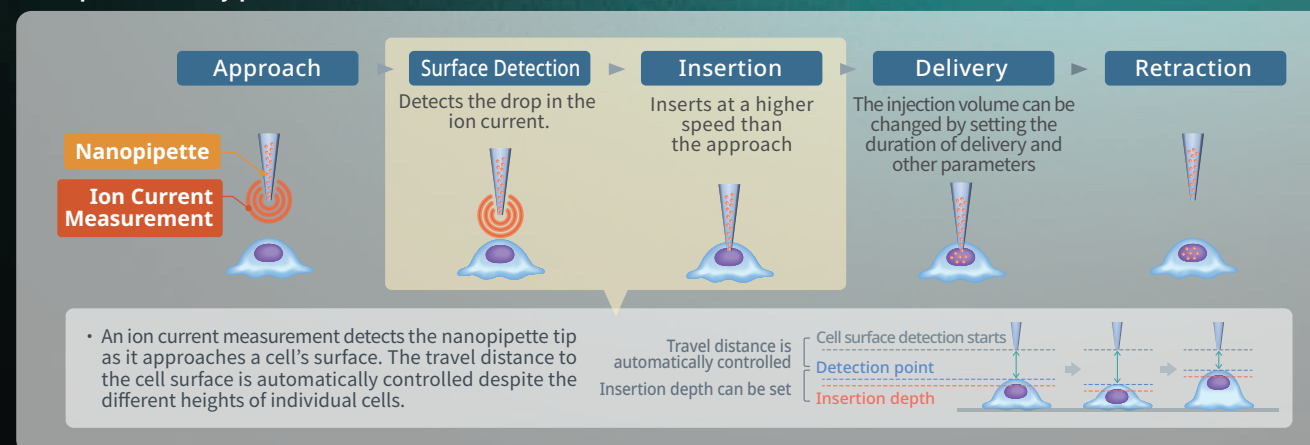
HeLa cells were cultured for 5 days following delivery of a cell-tracking fluorescent reagent (FITC-conjugated dextran). Cells that divided three times or more were counted as viable (n = 30).

Automated, high speed, and high success rate

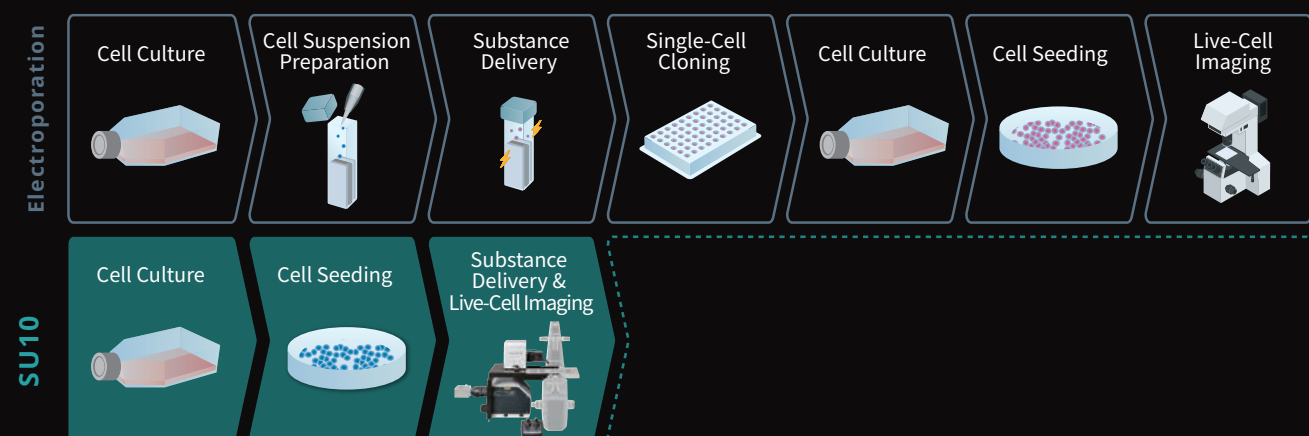
The SU10 uses automated cell surface detection, insertion, and delivery to the cell. The process takes approximately 10 seconds with a 90% success rate.*

* Experiment by Yokogawa

Nano-point delivery process



Seamless Integration of Precise Delivery and High-Speed Live-Cell Imaging



Whether you're starting out or pushing the boundaries,

CSU & SU10
take live-cell
analysis further

Specification

System		Fluorescence microscope version	Confocal microscope version	Super-resolution microscope version	
Operation Environment	Temperature and humidity	SU10 main unit and electrode head: 5 to 40°C, 80%RH or less (without condensation) Others: 15 to 35°C, 20 to 70%RH (without condensation)			
	Vibration isolation table recommended. Mounting surface dimensions (reference)*1	600 (W) × 600 (D) mm or more	700 (W) × 600 (D) mm or more	1200 (W) × 600 (D) mm or more	
External dimensions	System dimensions (reference)*1		800 (W) × 700 (D) mm	1200 (W) × 700 (D) mm	1500 (W) × 700 (D) mm
	SU10	Main unit	337 to 456 (W) × 377 (D) × 230 (H) mm		
		Main controller	133 (W) × 364 (D) × 309 (H) mm		
		Joystick controller	140 (W) × 144 (D) × 114 (H) mm		
		Nano pipette	Tip outer diameter: Several tens of nanometers or less (reference value, for SU10ACC-NP02)		
	CSU	Main unit	—	Confocal unit for single-camera model 480 (W) × 327 (D) × 252 (H) mm (excl. adapter and camera)	Super-resolution option (additional dimensions) 425.0 (W) × 301.1 (D) × 122.5 (H) mm (excl. protrusions and supporting column)
Power unit		—	225 (W) × 378 (D) × 152 (H) mm		
Power*2	Power voltage		100 to 240 V AC ±10%		
	Power frequency		50/60 Hz		
	Power consumption		70 VA	320 VA max	

*1 Specifications may vary depending on the system configuration. For details, please contact Yokogawa Electric or your distributor.

*2 Separate power supplies are required for the microscope body and associated peripheral equipment.

■ Installation example

The nano-point delivery imaging system is highly expandable and can be upgraded to confocal and super-resolution microscopy.

Fluorescence Version



Confocal Version



Super-Resolution Version



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